Saskatchewan Ministry of Agriculture

SASKATCHEWAN CORN HEAT UNIT MAPS

CROPS

AGRICULTURE

The development of a corn plant is dependent on its genetic potential and the growing conditions that the plant is exposed to. This is the reason why producers should make variety selections that correspond to the corn heat unit (CHU) rating of their local area.

A CHU is a measure of the heat accumulated over the growing season specific to the physiological needs of a corn plant. The rate of growth of the plant increases with increasing temperatures. Corn heat unit accumulation begins on May 15 and ends on the date of the first fall killing frost with temperatures below -3 C. The corn heat unit calculation assumes that no growth occurs when night temperatures are below 4.4 C or day temperatures below 10 C. The calculation also assumes that maximum growth occurs at 30 C and decreases with higher temperatures (MAFRI, 2012). Areas in Saskatchewan that have potential for corn production receive, at minimum, 2100 CHU per year. The CHU accumulation for an area can be determined by referring to the Saskatchewan Accumulated Corn Heat Unit maps for silage and grain production (see figures). Select a variety that matches the CHU accumulation for an area using the specific CHU map for the type of corn grown. Saskatchewan Crop Insurance Corporation (SCIC) provides weather-based corn coverage for any killing frosts that occur before 2100 CHU have accumulated.

Field site selection is an important consideration prior to planting. CHU values higher than the area averages can be realized on south facing slopes, coarse-textured soils, near shelterbelts, and where aggressive residue management, which blackens the soil, occurs. Seeding before soils reach eight degrees Celsius, at the four to five cm (1.5-2.0 inch) depth is not recommended.

Corn is capable of tolerating spring frosts as the growing point remains below the soil surface during the seedling stage and as such, early seeding is recommended. Seed germination and emergence requires a total of 175 CHU over 12 or more days following seeding. When seeding is delayed after mid-May, early-maturing corn varieties, or an alternative forage crop, should be considered.

The first 70 days following planting is the vegetative growth stage. Early competition from weeds delays seedling growth and impacts performance. Aggressive weed management is required to maximize yield potential and quality. From silk stage, in a period of 60 days, the plant moves through the reproductive stage to physiological maturity. Nutritional demands remain high throughout the reproductive phase.

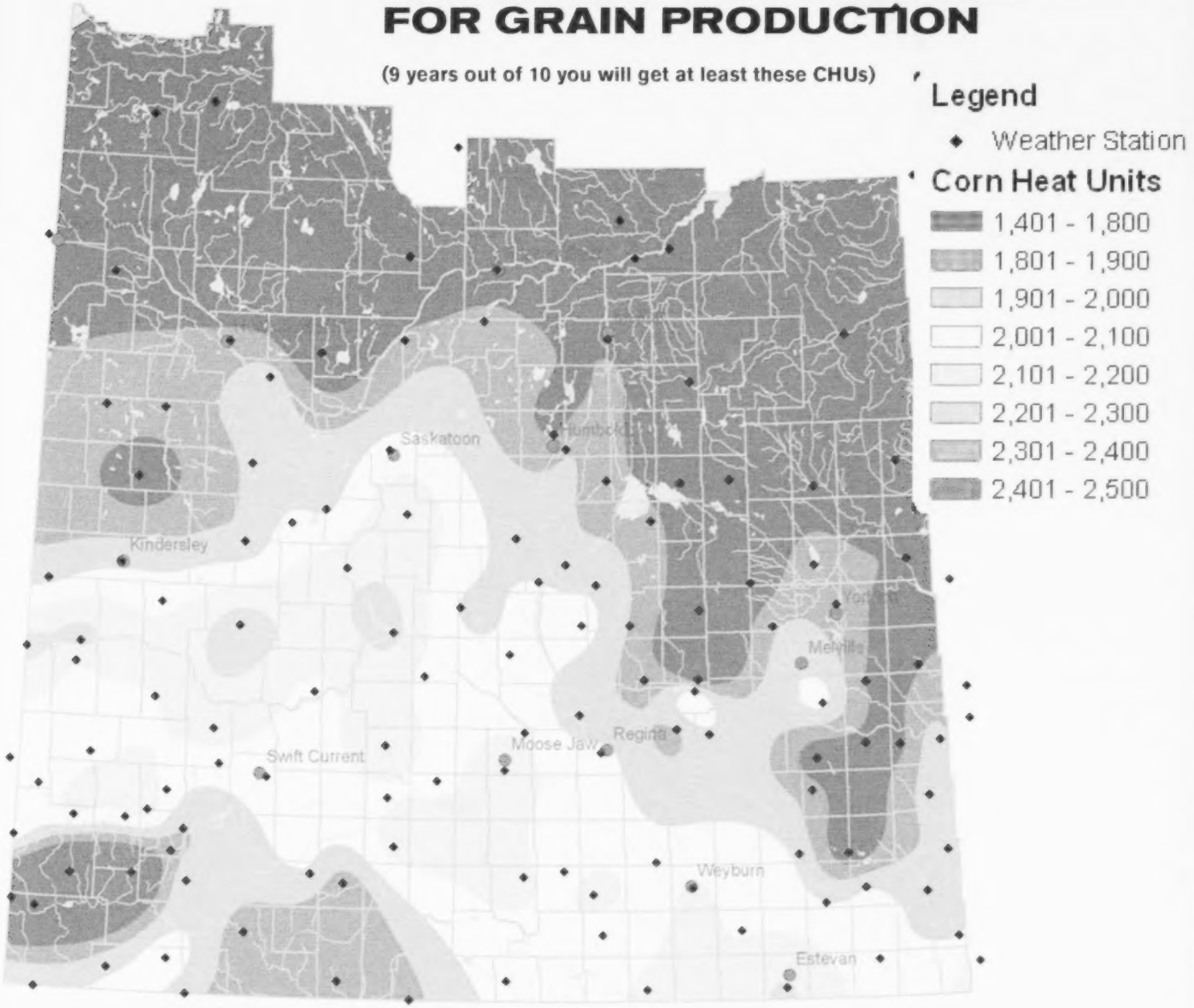
Drought risk is a concern when growing corn. The average seasonal water use for corn is 500 mm (20 inches). If grown as a dryland crop, producers may consider reducing plant populations if spring soil moisture levels are low. If grown under irrigation, irrigation scheduling must be managed to ensure that moisture is readily available for crop growth and development in August and early September.

Good quality corn silage can be achieved when grain kernel development uniformly reaches the half milk line stage. The milk line is the boundary between the solid and liquid starch portions of the maturing endosperm. Whole plant moisture at this time is near 65 %, but can be greatly impacted by an early frost.

As kernel development progresses, kernel moisture decreases to 32 % at maturity, which is also known as black layer. Grain corn can be harvested when kernel moisture reaches 30 %, but optimal harvest moisture content is between 20 % and 27 %. Expect to wait up to one month for kernel moisture to dry down from 32 % to 22 %. Drying to 15 % moisture content will be required for safe storage.

90 PER CENT CONFIDENCE FOR GRAIN PRODUCTION

(9 years out of 10 you will get at least these CHUs)



STAGES OF MATURITY:

Germination
First leaf
Second leaf to approximately 15 leaf
Tassel
Silk
Milk
Dough
Dent
Black Layer
Kernel dry down

Generally, hope to achieve silk by August 1 in Saskatchewan.

The CHU number of a variety is the number of CHU required to achieve 32 per cent kernel moisture.

If enough CHU are not received kernel formation will be incomplete and you will not achieve high energy levels. A TDN of 75 per cent for grain is an achievable target.

The seasonal CHU is calculated by a sum of all the daily CHU from May 15 until the first -3 degree celsius frost.

Daily CHU are calculated using the following equation:

$$CHU = [1.8 (Tmin - 4.4) + 3.3 (Tmax - 10) - 0.084 (Tmax - 10)^2] / 2$$

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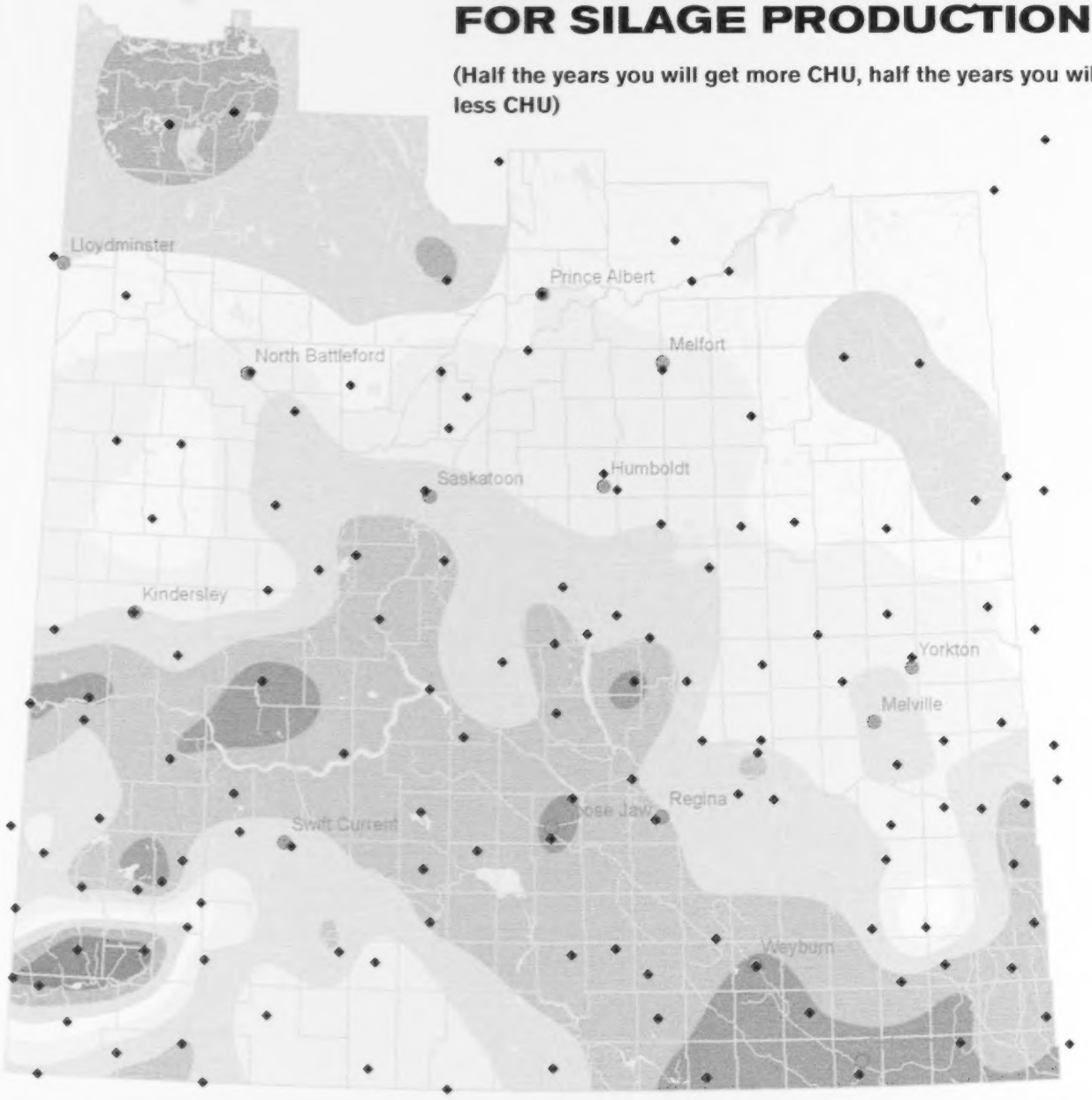
AVERAGE ACCUMULATED CHU FOR SILAGE PRODUCTION

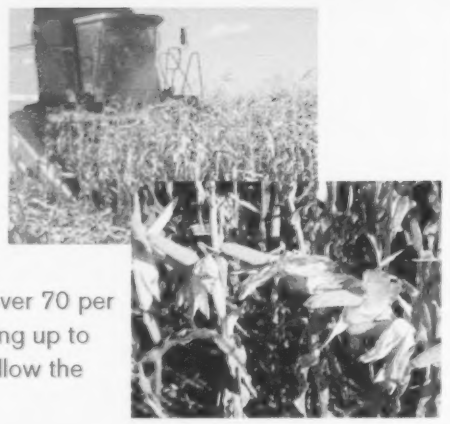
(Half the years you will get more CHU, half the years you will get less CHU)



Five hundred kernels can be harvested for every kernel seeded from a variety that suits your local environment.

When combining corn, the plant must have achieved sufficient maturity (black layer) and moisture. Safe storage for grain corn is 15 per cent M.C. Artificial drying will be required.

Great cob development delivers corn silage of over 70 per cent TDN. Spring delay and/or an early fall costing up to 200 seasonal CHU less than planned, will still allow the opportunity for good silage quality.



For more information on corn production:

- Refer to the publication Corn Production on the Saskatchewan Ministry of Agriculture website at www.agriculture.gov.sk.ca;

- Contact the Agriculture Knowledge Centre at 1-866-457-2377; or

- Contact your local Regional Forage Specialist.